

Preparation and Characterization of Electrospun CdTe Quantum Dots / Nylon-6 Nanofiber Mat

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Abstract : In this paper, electrospun CdTe quantum dot / nylon-6 nanofiber mats were successfully prepared. The nanofiber mats were characterized by FE-SEM, XRD and EDX analyses. The results revealed that fibers in different distinct sizes (nano and subnano scale) were obtained with the electrospinning parameters. The phenomenon of 'on ' and 'off ' luminescence intermittency (blinking) of CdTe QDs in nylon-6 was investigated by single-molecule optical microscopy, and we identified that the intermittencies of single QDs were correlated with the interaction of water molecules absorbed on the QD surface. The 'off' times, the interval between adjacent 'on' states, remained essentially unaffected with an increase in excitation intensity. In the case of 'on' time distribution, power law behavior with an exponential cutoff tail is observed at longer time scales. These observations indicate that the luminescence blinking statistics of water-soluble single CdTe QDs is significantly dependent on the aqueous environment, which is interpreted in terms of passivation of the surface trap states of QDs.

Keywords : electrospinning, CdTe quantum dots, Nylon-6, Nanocomposite

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